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Exploring Normative Leadership: An Egocentric Network Approach to Friends' Norm-Signaling Relevance

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This article examines friends' norm-signaling relevance, that is, the impact of friends' risk behaviors on individual normative perceptions (descriptive and injunctive) and indirect, norm-mediated effects on individual risk behavior. Specifically, and inspired by the concept of opinion leadership, I explore whether there are normative leaders: friends who are recognized as advisors and who have a distinct norm-signaling relevance by shaping normative perceptions to a particular extent. Hypotheses are tested based on egocentric networks of 311 young drivers (egos) and three of their friends regarding three road traffic risk behaviors (i.e., speeding, driving after drinking, and texting while driving). The results corroborate the idea of the norm-signaling relevance of friends' behaviors and the special role of normative leaders in this regard. Friends who are recognized as advisors by the egos have a distinct impact on injunctive normative perceptions, that is, perceptions about the behavior's social approval among friends. Implications for social norms research, opinion leadership research, and norms-based interventions are discussed.

Keywords: social norms, normative social influences, opinion leadership, egocentric networks, risk behaviors, norms-based intervention

People orient their behavior toward social norms to ensure that they act efficiently and that their actions are socially approved (Cialdini, Reno, & Kallgren, 1990). But how do people know what is normative in their reference groups? How are perceptions of the typicality and social approval of behaviors acquired? Compared with the large body of research on the link between norms and behavior (for an overview, see Mollen, Rimal, & Lapinski, 2010; Shulman et al., 2017), there is relatively little research addressing the question of how people learn about norms (cf. Geber, Baumann, & Klimmt, 2019; Kashima, Wilson, Lusher, Pearson, & Pearson, 2013; Paluck & Shepherd, 2012).

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In this article, I aim to shed light on the formation of normative perceptions and its behavioral implications. I examine the norm-signaling relevance of friends' behaviors, that is, the impact of friends on an individual's perceived descriptive (i.e., perceived prevalence) and injunctive norms (i.e., perceived social approval), and the impact of these normative perceptions on an individual's behavior. In reference to social impact theory (Latané, 1981) and inspired by the concept of "opinion leaders" (Katz & Lazarsfeld, 1955; Lazarsfeld, Berelson, & Gaudet, 1944), I additionally explore whether friends who are recognized as advisors serve as "normative leaders" and shape normative perceptions to a particular extent (see also Paluck & Shepherd, 2012; Paluck, Shepherd, & Aronow, 2016).

The idea of the norm-signaling relevance of friends' behaviors and the particular role of advisor friends in this regard is examined based on egocentric networks of 311 young drivers (egos) and three of their friends in the context of road traffic safety. Road traffic injuries are the leading cause of death among young people 15–29 years of age (World Health Organization, 2015, p. vii). Three road traffic risk behaviors serve as cases of examination in the present study as they are widely prevalent among adolescents and can have fatal consequences for them and for other road traffic users (World Health Organization, 2015): speeding, driving after drinking (drinking and driving), and texting while driving (texting and driving).

With its egocentric networks approach, the article contributes to two lines of research. First, in social norms research, Paluck and Shepherd's (2012; see also Paluck et al., 2016; Shepherd & Paluck, 2015) studies refer to "social referents," pupils who are "highly connected and chronically salient" (p. 899) in large school networks, and examine the extent to which they shape normative perceptions. The present study, in contrast, is dedicated to small egocentric networks and asks whether close friends who are socially recognized as advisors play a special role in the formation of normative perceptions. Second, the idea of particular influential people in normative social influences, who are referred to as normative leaders in the present article, is relevant for the line of opinion leadership research. This study's results inform whether the meaning of opinion leaders in normative social influences might provide a future perspective for the opinion leader concept, which has been nominated for "retirement" by Katz and Fialkoff (2017). Last, the idea about normative leaders is of practical relevance as corresponding results indicate whether there are certain group members who should be particularly considered in norms-based intervention strategies (Berkowitz, 2004).

Descriptive and Injunctive Normative Perceptions

Following the theory of normative conduct (Cialdini et al., 1990), I distinguish between descriptive norms and injunctive norms. *Descriptive norms* refer to the prevalence of a behavior within the referent group; *injunctive norms* pertain to the social approval of the behavior by relevant others. Thus, the two types of norms can be thought of as norms regarding what is done (descriptive) compared with norms of what ought to be done (injunctive; Kallgren, Reno, & Cialdini, 2016). Descriptive norms influence behavior because of people's motivations to do the right thing; they promote behaviors by providing an "information-processing advantage" (Cialdini et al., 1990, p. 1015) about what may be an effective and adaptive action. Injunctive norms, on the other hand, are thought to influence behavior because of people's motivations for affiliation with others (Cialdini et al., 1990).

Descriptive and injunctive norms are perceived norms at the individual level (Lapinski & Rimal, 2005; Rimal & Lapinski, 2015); they are individual perceptions of the group's codes of conduct, pre- or proscribing behaviors that members of a group can enact (Lapinski & Rimal, 2005, p. 129). To conceptually differentiate between normative perceptions and a peer group's actual norms operating at the group level, the latter are also referred to as *collective norms* (Rimal & Lapinski, 2015) or *actual norms* (Berkowitz, 2004, p. 5). The differentiation between collective (actual) and perceived norms (see also Geber, Baumann, Czerwinski, & Klimmt, 2019) raises the question of how collective norms are transferred to individuals' normative perceptions, or in other words, how normative perceptions of the reference group's behaviors and attitudes are built.

Formation of Normative Perceptions

Friends' Norm-Signaling Relevance

During the course of everyday interaction, individuals encounter various normative "signals" (Shepherd & Paluck, 2015), signals based on which they form their normative perceptions (Mead, Rimal, Ferrence, & Cohen, 2014; Tankard & Paluck, 2016). Mead et al. (2014) refer to this phenomenon as "social exposure," which they define as "a specific type of information source that conveys norms and indirectly shapes individuals' attitudes and behaviors" (p. 140). There are various sources of normative signals, such as the media (Mead et al., 2014). However, a major source of information about the reference group's norms is the behavior of reference group members (Mead et al., 2014; Tankard & Paluck, 2016).

This idea is also found in the exemplar theory of category learning (Kahneman & Miller, 1986; Kashima, Woolcock, & Kashima, 2000), according to which the attributes (e.g., attitudes or behaviors) of an individual who belongs to a collective are encoded as exemplars of the collective. These exemplars are generalized by social inference and form the cognitive representations of the collective regarding the distribution of the members' behaviors and the prevailing attitudes within the collective. Kashima et al. (2013) applied this key assumption of exemplar learning to social networks and postulated that information relevant for category learning comes from those with whom people are connected through social network ties. In a study on the acquisition of a descriptive norm for community engagement in a rural city in Australia (N = 104), Kashima et al. found that people's perceptions are linked to their ties' behavior. If associates are personally engaged in maintaining and transforming their community, people tend to think the community is engaged as a whole (see also Shepherd, 2017).

The present study is dedicated to norm-signaling in egocentric networks of young drivers (egos) and their friends. The idea of norm-signaling is thought to conceptually link friends' normative signals (which they send by enacting a certain behavior) with the cognitive formation of the ego's descriptive and injunctive normative perceptions. Research on road traffic risk behaviors has shown that peers are the most important reference group for road traffic risk behaviors compared with other social groups, such as family (Fleiter, Watson, Lennon, & Lewis, 2006; Zhang, Wieczorek, & Welte, 2012). Given the argumentation about category learning within networks (Kashima et al., 2013, 2000), I assume that the road traffic risk behaviors of three friends would serve as normative signals based on which young drivers infer risk behavior norms in their broader circle of friends. Whereas previous research has focused on the formation of perceptions

about descriptive norms, the present approach also considers perception formation of injunctive norms. Following the assumption that a behavior is viewed "as correct in a given situation to the degree that we see others performing it" (Cialdini, 2001, p. 100), I expect that friends' behaviors would also convey social approval signals. Thus, I hypothesize that in egocentric friend networks, the ego would use friends' risk behaviors to infer the prevalence (i.e., descriptive norms) and the social approval of this risk behavior (i.e., injunctive norms) in his or her broader circle of friends.

H1: Friends' risk behaviors influence the ego's perceived descriptive (H1a) and injunctive (H1b) norms.

To capture friends' entire norm-signaling relevance, the present study also addresses the effects on the young driver's risk behaviors resulting from the impact of friends on the formation of norms (Mead et al., 2014). Given the substantial evidence on the effects of descriptive and injunctive norms on a wide range of risk behaviors (for a meta-analysis, see Manning, 2009), among others, speeding, drinking and driving, and texting and driving (Åberg, 1993; Bazargan-Hejazi et al., 2017; Cestac, Paran, & Delhomme, 2011), it is highly plausible that the impact of friends' norm-signaling comes with behavioral effects. Thus, I assume that friends' behaviors would have an indirect, norm-mediated impact on the ego's behavior in egocentric friend networks.

H2: Through the formation of descriptive (H2a) and injunctive (H2b) normative perceptions, friends' risk behaviors influence the ego's risk behaviors.

Advisor Friends' Norm-Signaling Relevance

The studies and hypotheses on the formation of normative perceptions suggest that individuals infer group norms from various normative signals in everyday interactions. However, given individuals' "limited attention and access to information about what others do" (Tankard & Paluck, 2016, p. 182), it is highly plausible that individuals orient toward particular members instead of following different group members equally (Paluck & Shepherd, 2012, p. 900). These specific members might serve as referent points and are particularly influential in normative social influences by shaping normative perceptions to a distinct extent (see also Paluck et al., 2016; Tankard & Paluck, 2016).

Social impact theory (Latané, 1981) suggests that the "strength" of group members determines the extent to which others orient toward them. By strength, Latané (1981) means "the salience, power, importance, or intensity of a given source to the target" (p. 344). In communication science, the idea about people with particular strength in social influences is found in opinion leadership research (Katz, 2015; Katz & Lazarsfeld, 1955; Lazarsfeld et al., 1944). Opinion leaders are "people who influence the opinions, attitudes, beliefs, motivations, and behaviors of others" (Valente & Pumpuang, 2006, p. 881; see also Hellevik & Bjørklund, 1991; Rogers, 1995). Katz and Lazarsfeld (1955) characterize their leadership as "casually exercised, sometime unwitting and unbeknown, within the smallest grouping of friends" (p. 138). Accordingly, their strength in social influences is not primarily rooted in prominence or in high socioeconomic status (Lazarsfeld et al., 1944, p. 50), but in their recognition as a source of advice by their followers (Weimann, 1994, p. 83). This relational nature of opinion leadership (Friemel, 2015; Geber, 2019; Schäfer & Taddicken, 2015) is clearly stated in Katz's (1957) notion that "it takes two to be a leader—a leader and

a follower" (p. 74). Consequently, opinion leaders are often defined and identified based on their recognition as an advisor by others, particularly in sociometric studies (Coleman, Katz, & Menzel, 1966; Rogers & Cartano, 1962; Weimann, 1994). Although opinion leadership research has been on the agenda of communication science for more than 70 years (Katz, 2015), the role of opinion leaders in normative social influences has not been addressed sufficiently (Katz & Fialkoff, 2017).

In reference to social impact theory and inspired by the concept of opinion leadership, I ask whether there are *normative leaders*: friends who are recognized as advisors and who are particularly influential over normative perceptions and, in turn, over behaviors. Within an egocentric network approach, I identify friends who function as advisors for young drivers (egos). These advisor friends should affect normative perceptions to a particular extent for mainly two reasons. First, as advisors exemplify the values of their followers (Rogers & Cartano, 1962, p. 437), their behaviors might be interpreted as particularly representative for the collective and specifically signal what is prevalent and socially approved in the group of friends (Kahneman & Miller, 1986; Kashima et al., 2000). Second, advisors raise more awareness (Valente & Pumpuang, 2006, p. 891), because they generally have stronger ties to their followers. Taking up the idea of Kashima et al. (2013) that social category information comes through social network ties, it is plausible that stronger ties increase the likelihood that advisors' behavior is used as a source of norm information (see also Rice, 1993).

In the line of social referent research, two studies by Paluck and colleagues[2] (Paluck & Shepherd, 2012; Paluck et al., 2016) revealed that network members who have many ties to individuals across entire networks and/or hold central positions within subgroups (i.e., social referents) influence normative perceptions and "have an outsized influence over social norms and behavior" (Paluck et al., 2016, p. 566) compared with other peers. Although there are some differences between the current idea on normative leaders who are ego-recognized advisors in small egocentric friend networks and the concept of social referents who represent larger networks as a whole, these studies can be interpreted as empirical evidence that there are peers who play a distinct role in normative social influences.

Given the arguments linked to social impact theory and the opinion leader concept, as well as the empirical evidence of social referent research, I hypothesize that friends who are socially recognized as advisors by young drivers would take the role of normative leaders. These friends would be particularly influential in normative social influences on road traffic risk behaviors by shaping normative perceptions about the behaviors' prevalence and social approval to a particular extent. Consequently, I assume that the friend who is recognized as an advisor in egocentric friend networks would have a greater influence on perceived descriptive and injunctive norms than nonadvisor friends.

[2] Both studies were field experiments with randomized antiharassment interventions across school networks. The first study was based on the network of a small public high school, with 291 participants (Paluck & Shepherd, 2012); the second study was a social network experiment in 56 schools (N = 24,191; Paluck et al., 2016). Social network analysis was used to map entire social networks and to identify social referents; a subset of these social referents was randomly assigned to an intervention program, accompanied by repeated measures.

H3: The influence of the advisor friend's risk behavior on perceived descriptive (H3a) and injunctive (H3b) norms is greater than that of friends who are not recognized as advisors.

Method

Egocentric Network Sampling

To test the hypotheses on friends' norm-signaling relevance and the role of advisor friends in this regard, I used egocentric network data. The data were collected as part of a research project funded by the German Ministry of Transport and Digital Infrastructure and operated by the Allensbach Institute of Public Opinion Research.[3] The networks were assessed with an egocentric sampling strategy. A representative sample of N_{Ego} = 311 young German drivers who had a driver's license and who were 18–24 years of age was drawn (i.e., the egos). These young drivers were selected by quota sampling based on data from the Federal Office for Motor Traffic and the German Federal Statistical Office. The sample had a mean age of 21.28 years (*SD* = 2.05), and 49% were women.

Every ego nominated three friends. As the primary aim was to establish egocentric friend networks representing friendship relations, license possession was not a precondition for the sampling of friends. Consequently, 44% of the networks consisted of at least one friend who was not in possession of a driver's license.[4] The friends' sample (N_{Friend} = 933) was 22.72 years old (*SD* = 6.49) on average, and 49% were women.

After the young drivers and their friends had agreed to participate in the study, they were interviewed independently at their homes. All interviews were realized as computer-assisted face-to-face interviews by interviewers from the Allensbach Institute of Public Opinion Research in April to June 2016. Numerous questions were asked, such as about attitudes toward road traffic risk behaviors, self-efficacy relative to the risk behaviors, and lifestyles. However, the present article refers only to data on friends' road traffic risk behaviors, egos' normative perceptions, egos' road traffic risk behaviors, and egos' advisor friend nominations.

Measurements

Egos' and Friends' Road Traffic Risk Behaviors

The egos and their friends were asked questions about their road traffic risk behaviors (see Table 1). All three risk behaviors under study were measured through self-reports, with responses given on a 5-point Likert scale, ranging from 0 = *never* to 4 = *very often*, about the frequency with which they drove

[3] Find further information about the Allensbach Institute of Public Opinion Research here: http://www.ifd-allensbach.de/service/english/summary.html

[4] In 28% (*n* = 87) of the networks, one peer did not have a driver's license; in 13% (*n* = 39) of the networks, two peers did not have a driver's license; and in 4% (*n* = 11) of the networks, all three peers of the ego did not have a driver's license.

significantly faster than allowed (speeding), drove a car after having drunk alcohol (drinking and driving), and held a cell phone or smartphone while driving (texting and driving).

Table 1. Description of Egos' and Friends' Road Traffic Risk Behaviors and Perceived Norms.

	Speeding	Drinking and driving	Texting and driving
	M (*SD*)	*M* (*SD*)	*M* (*SD*)
Ego behavior[a]	1.77 (0.93)	0.93 (1.05)	1.81 (1.15)
Ego PDN[a]	1.95 (0.83)	1.47 (1.08)	1.89 (1.07)
Ego PIN[b]	1.23 (0.80)	1.39 (0.94)	1.29 (0.81)
Friend behavior[a]	1.63 (0.99)	0.88 (1.05)	1.61 (1.17)

Note. n_{Ego} = 297–311; n_{Friend} = 729–734; PDN = perceived descriptive norm; PIN = perceived injunctive norm.
[a]Measured on a scale ranging from 0 = *never* to 4 = *very often*. [b]Measured on a scale ranging from 0 = *does not apply* to 3 = *applies completely*.

Egos' Perceived Norms

Egos' perceived descriptive norms were measured as their perceptions of the frequency their friends engaged in risk behaviors (see Table 1; see also Real & Rimal, 2007; Rimal & Real, 2005). Egos rated on 5-point scales, ranging from 0 = *never* to 4 = *very often*, how often they estimated their friends performed the three risk behaviors (e.g., "How often do your friends drive too fast?"). Injunctive norms were measured by one item for each risk behavior representing the egos' perceptions of social approval (e.g., "Most of my friends think it's okay to drive faster than it is allowed") on a 4-point scale, ranging from 0 = *does not apply at all* to 3 = *applies completely* (see also Rimal & Real, 2005). In this vein, descriptive and injunctive norms were operationalized as "prorisk norms": The higher the value, the higher the perceived risk affinity of the egos' friends.

Egos' Advisor Friends

To explore whether there were normative leaders among young drivers' friends, I identified the egos' advisor friends (see Valente & Pumpuang, 2006). More concretely, and following the sociometric approach in opinion leadership research, I identified advisor friends by asking each ego to whom of his or her nominated friends he or she was most likely turn for advice on life issues. In this way, "polymorphic" advisors were assessed who were not limited to a specific field, such as road traffic behaviors, in contrast to content-related or "monomorphic" advisors (Merton, 1949, p. 213). Of the egos, 93% (*n* = 289) nominated one advisor friend; 7% (*n* = 22) did not make a nomination.

Information on the egos' ties to their friends was obtained. Contact frequency was measured by asking egos how often they had contact with their friends on a scale ranging from 1 = *seldom* to 4 = *very often*. The relationship's strength was measured by asking egos how they would describe their relationship on a scale ranging from 0 = *very loose* to 4 = *very tight*. Third, the relationship duration was operationalized in years by asking egos how long they had known their friends. Table 2 displays that egos' ties to their advisor friends differed significantly from the relationships with their nonadvisor friends. Egos had more

frequent contact with their advisor friends, their relationships were more intimate, and egos and their advisor friends had known each other longer.

Table 2. Egos' Ties to Their Advisor and Nonadvisor Friends.

Variable	Ego and advisor friends *M (SD)*	Ego and nonadvisor friends[a] *M (SD)*	*F*	*df*	*p*
Frequency[b]	3.50 (0.60)	2.99 (0.61)	199.32	1, 285	<.001
Strength[c]	3.48 (0.62)	2.66 (0.71)	317.52	1, 285	<.001
Duration[d]	10.14 (6.56)	8.46 (5.75)	22.67	1, 274	<.001

Note. n_{Ego} = 275–286, listwise deletion of cases; analysis of variance for repeated measures.
[a]Means of the ties to both nonadvisor friends.
[b]Frequency of contact: 1 = *seldom*, 4 = *very often*.
[c]Strength of relationship: 0 = *very loose*, 4 = *very tight.*
[d]Duration of relationship in years.

Statistical Analyses

Friends' risk behaviors were assigned as variables to the corresponding young drivers (egos) to correlate the friends' behaviors with the egos' normative perceptions and behaviors. Thus, in the following analyses, egos' friend networks are the unit of analysis (N_{Ego} = 311). Preliminary analyses (see Table 3) demonstrated substantial zero-order correlations among the study variables, indicating the normative relevance of friends in the road traffic context.

Table 3. Zero-Order Correlations Among the Study's Variables.

	Speeding					Drinking and driving					Texting and driving				
Variable	2	3	4	5	6	2	3	4	5	6	2	3	4	5	6
1. Friend 1 behavior	.21	.32	.40	.22	.42	.42	.41	.42	.30	.48	.34	.34	.40	.33	.39
2. Friend 2 behavior	–	.31	.36	.17	.33	–	.19	.45	.31	.49	–	.29	.37	.31	.41
3. Friend 3 behavior		–	.31	.12*	.36		–	.35	.28	.33		–	.31	.08*	.33
4. Ego PDN			–	.48	.58			–	.55	.61			–	.54	.68
5. Ego PIN				–	.38				–	.50				–	.51
6. Ego behavior					–					–					–

Note. n_{Ego} = 199–311; pairwise deletion of cases; PDN = perceived descriptive norm; PIN = perceived injunctive norm.
*Correlations are not significant; all other correlations are significant at the p = .01 level.

To gain more specific insights into the friends' norm-signaling relevance and the meaning of advisor friends in this regard, I used structural equation modeling. The basic model defined paths from friends' risk behaviors to the ego's descriptive and injunctive normative perceptions and to the ego's risk behaviors (see Figure 1). A two-step modeling strategy was applied to test the hypotheses about the norm-signaling relevance of friends in the first step (H1, H2) and the hypothesis on the role of advisor friends in the second step (H3).

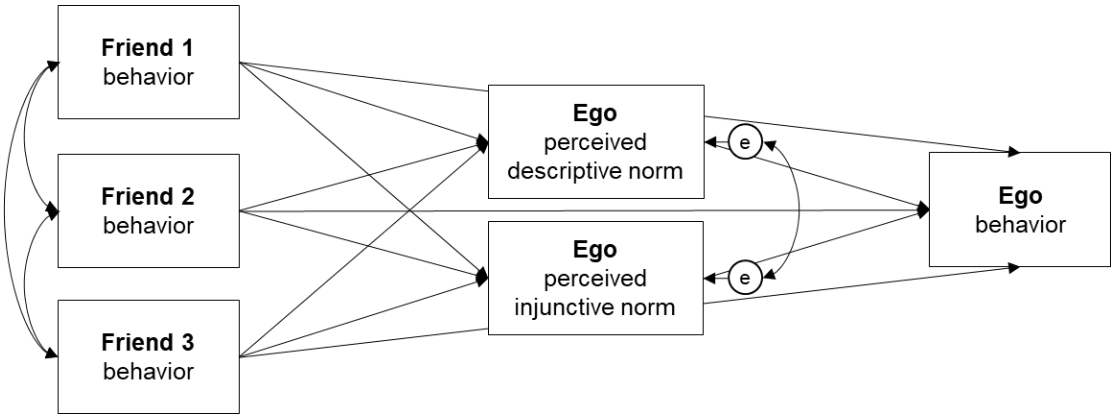

Figure 1. Basic model of friend's norm-signaling relevance.

In the first step, the three friends and their risk behaviors were treated as "undistinguishable" (Kenny, Kashy, & Cook, 2006), and all paths from friends' behavior were set equal. To test Hypothesis 1, I estimated the paths between friends' risk behaviors and the ego's perceived descriptive (H1a) and injunctive (H1b) norms. Hypothesis 2 was tested by defining descriptive and injunctive norms as intervening variables and estimating indirect effects of friends' behaviors through descriptive (H2a) and injunctive (H2b) normative perceptions on the ego's risk behaviors with bootstrapping (Preacher & Hayes, 2008). Following the recommendations of Preacher and Hayes (2008), I allowed the residuals of descriptive and injunctive norms to covary to avoid biases in standard errors (p. 882), and the direct effect of friends' behaviors on the ego's behavior were estimated to avoid inflated indirect effects estimates (p. 883).

In the second step, the paths of the advisor friend and both nonadvisor friends were estimated separately. To test whether the influence of the advisor friend's risk behaviors on the ego's perceived descriptive (H3a) and injunctive (H3b) norms was greater than the influence of nonadvisor friends, I compared the coefficients of the advisor friend and nonadvisor friend paths. More specifically, I used the Wald test[5] to test the difference between the path coefficients of the advisor friend and nonadvisor friends for statistical significance.

As mentioned, the data consisted of missing data as license possession was not a precondition in the sampling of the ego's friends. Analyses[6] indicated that the missing data mechanism may not be classified

[5] Wald test: $b_{\text{Advisor}} - b_{\text{Nonadvisor}}/SE(b_{\text{Advisor}} - b_{\text{Nonadvisor}})$.

[6] The friends' behavior variables were recorded in dummy variables (1 = not missing; 0 = missing), and *t* tests between these variables and egos' normative perceptions and risk behaviors were run.

as missing completely at random but at least as missing at random (MAR; Heitjan & Basu, 1996; Rubin, 1976). This means that the missingness was not related to the dependent variables themselves—egos' normative perceptions and risk behavior—but to the egos' age (i.e., the networks of younger egos have more missing data as they had more friends who did not yet have a driver's license). Under the MAR condition, full information maximum likelihood (FIML) estimation provides unbiased estimates and is superior compared with other missing data methods, such as listwise deletion, pairwise deletion, and similar response pattern imputation (Enders & Bandalos, 2001). In this method, missing values are not replaced or imputed; by using all available information, FIML infers "what the whole model should look like without needing to know what the missing responses would truly be" (Little, Jorgensen, Lang, & Moore, 2014, p. 154). Consequently, FIML was used in the present study. The analyses were run separately for speeding, drinking and driving, and texting and driving, using the R package lavaan (Rosseel, 2012).

Results

The first set of models estimated the influence of friends' risk behaviors on egos' perceived norms (H1) and the indirect, norm-mediated effects of friends' behavior on the egos' behavior (H2; see Table 4).

Table 4. Friends' Effects on the Ego's Perceived Norms and Road Traffic Risk Behaviors.

	Speeding		Drinking and driving		Texting and driving	
Variable	*b* (*SE*)	*p*	*b* (*SE*)	*p*	*b* (*SE*)	*p*
Ego PDN						
Friend behavior	0.19 (0.02)	<.001	0.24 (0.03)	<.001	0.20 (0.02)	<.001
R^2	.248		.275		.228	
Ego PIN						
Friend behavior	0.10 (0.02)	<.001	0.16 (0.02)	<.001	0.10 (0.02)	<.001
R^2	.067		.153		.103	
Ego behavior						
Ego PDN	0.41 (0.07)	< 001	0.32 (0.05)	<.001	0.49 (0.06)	<.001
Ego PIN	0.14 (0.06)	.016	0.22 (0.06)	<.001	0.26 (0.07)	<.001
Friend behavior	0.13 (0.03)	<.001	0.14 (0.02)	<.001	0.11 (0.02)	<.001
R^2	.419		.482		.531	
Indirect effects on ego behavior[a]						
via Ego PDN	0.04 (0.01)	.001	0.05 (0.01)	<.001	0.05 (0.01)	<.001
via Ego PIN	0.01 (0.01)	.030	0.03 (0.01)	.001	0.03 (0.01)	.003
Cov. PDN PIN	0.24 (0.04)	<.001	0.34 (0.05)	<.001	0.33 (0.05)	<.001

Note. N_{Ego} = 311; full information maximum likelihood estimation; PDN = perceived descriptive norm; PIN = perceived injunctive norm.
Speeding: $\chi^2(6) = 5.441$, $p = .489$; comparative fit index (CFI) = 1.000; root mean square error of approximation (RMSEA) = .000; standardized root mean residual (SRMR) = .028.
Drinking: $\chi^2(6) = 6.430$, $p = .377$; CFI = 0.999; RMSEA = .015; SRMR = .023.
Texting: $\chi^2(6) = 6.904$, $p = .330$; CFI = 0.998; RMSEA = .022; SRMR = .024.
[a]Estimation of *SE* for indirect effects via bootstrapping.

The fit indexes indicated good fits for the models across all three road traffic behaviors (see the notes for Table 4; Hu & Bentler, 1999). The results supported Hypothesis 1 and revealed that friends' road traffic risk behaviors significantly influenced the egos' perceived descriptive (H1a) and injunctive (H1b) norms across all three road traffic risk behaviors. The more friends engaged in speeding, drinking and driving, and texting and driving, the more the ego believed that the risk behaviors were prevalent (i.e., perceived descriptive norms) and socially approved (i.e., perceived injunctive norms) within his or her broader circle of friends. In the case of descriptive norms, friends' behaviors explained about 23% to 28% of the ego's normative perceptions; regarding injunctive norms, 7% to 15% of the perceived social approval was explained by friends' behaviors.

The models showed further that friends' behaviors were directly associated with the ego's behavior. However, the present study was interested in friends' norm-signaling relevance, that is, the extent to which friends also affected behaviors through the formation of normative perceptions. Table 4 reveals that friends' risk behaviors indirectly influenced the ego's risk behaviors. Thus, the results also corroborated Hypothesis 2, assuming that friends were influential through shaping descriptive (H2a) and injunctive (H2b) normative perceptions about the behavior's prevalence and its social approval.

As previous studies have revealed that sociodemographics can be relevant in the context of road traffic risk behaviors (Rhodes & Pivik, 2011), the analyses were run again, and sociodemographics were controlled by regressing perceived norms and road traffic risk behavior on the ego's age, sex, and socioeconomic status (SES).[7] The main results were not affected by this procedure. Sociodemographics were relevant only for drinking and driving (sex: $b = 0.32$, $SE = 0.08$, $p < .001$; age: $b = 0.06$, $SE = 0.02$, $p = .011$) and texting and driving (sex: $b = 0.18$, $SE = 0.09$, $p = .044$), but not relative to normative perceptions.

To test Hypothesis H3 that advisor friends play a special role in normative social influences by exerting a greater influence on perceived norms than nonadvisor friends, I allowed the influence path of the advisor friend to differ in the second set of models (see Table 5). Again, the models revealed a good fit (see the notes for Table 5). For descriptive normative perceptions, the Wald test did not reveal a significantly different impact between the advisor friend and the nonadvisor friends. Thus, Hypothesis 3a was not corroborated. However, in line with Hypothesis 3b, the results indicated that the advisor friend was crucial in the formation of injunctive normative perceptions. In the cases of speeding and drinking and driving, the impact of the advisor friend's behavior on the ego's perceived social approval was significantly greater than the influence of the nonadvisor friends.

[7] SES was computed by combining information regarding the monthly household income and the level of education into a 6-point scale ranging from 1 = *lowest SES* to 6 = *highest SES* ($M = 4.33$, $SD = 1.26$).

Table 5. Comparison of the Advisor Friend's and Nonadvisor Friends' Behavior Effects on the Ego's Perceived Norms.

	Speeding		Drinking and driving		Texting and driving	
Variable	*b* (*SE*)	*p*	*b* (*SE*)	*p*	*b* (*SE*)	*p*
Ego PDN						
Advisor friend behavior	0.27 (0.05)	<.001	0.32 (0.06)	<.001	0.20 (0.06)	<.001
Nonadvisor friend behavior	0.16 (0.03)	<.001	0.21 (0.04)	<.001	0.19 (0.03)	<.001
Difference[a]	0.11 (0.01)	.065	0.11 (0.01)	.098	0.00 (0.01)	.480
Ego PIN						
Advisor friend behavior	0.19 (0.05)	.001	0.26 (0.06)	<.001	0.10 (0.05)	.028
Nonadvisor friend behavior	0.05 (0.03)	.122	0.11 (0.03)	<.001	0.10 (0.03)	<.001
Difference[a]	0.14 (0.01)	.033	0.15 (0.01)	.029	0.01 (0.00)	.468

Note. N_{Ego} = 311; full information maximum likelihood estimation; PDN = perceived descriptive norm; PIN = perceived injunctive norm.
Speeding*:* $\chi^2(3) = 1.465$, $p = .690$ comparative fit index (CFI) = 1.000; root mean square error of approximation (RMSEA) = .000; standardized root mean residual (SRMR) = .013.
Drinking: $\chi^2(3) = 0.122$, $p = .898$ CFI = 1.000; RMSEA = .000; SRMR = .003.
Texting: $\chi^2(3) = 6.825$, $p = .078$ CFI = 0.990; RMSEA = .064; SRMR = .023.
[a]*Difference* in effect sizes between the advisor friend and both nonadvisor friends, Wald test ($b_{Advisor} - b_{Nonadvisor}/SE(b_{Advisor} - b_{Nonadvisor})$, one-tailed.

Discussion

Norm-Signaling in Egocentric Friend Networks

Norm-Signaling of Friends

This study lends credence to the norm-signaling relevance of friends' behaviors in egocentric networks. It revealed that friends' road traffic risk behaviors serve as normative signals based on which young drivers infer prevailing norms about speeding, drinking and driving, and texting and driving in their circle of friends. This finding is in line with the idea of social exposure (Mead et al., 2014) and social category learning within networks (Kashima et al., 2013). It suggests that the behavior of associates who are connected through social network ties (i.e., three nominated friends) convey information about norms in a broader collective (i.e., circle of friends). In contrast to previous research, the present study not only focused on the formation of descriptive norms, but also considered injunctive norms. Although the results show that friends' behaviors are more important for the formation of perceptions about the prevalence of a behavior (i.e., descriptive norms), behaviors also turned out to serve as normative signals informing about the behavior's social approval among friends (i.e., injunctive norms). Thus, when people see others performing a behavior, they seem to infer that this behavior is also socially approved by others (Cialdini et al., 1990; Lapinski & Rimal, 2005; Rimal & Real, 2005).

Moreover, the results demonstrate that descriptive and injunctive norms influence individuals' risk behaviors, which is not a new finding and is completely in line with the state of research on normative

influences on (risk) behaviors (for a meta-analysis, see Manning, 2009). Consequently, the norm-signaling relevance of friends' behaviors is not limited to shaping normative perceptions. Through the formation of norms, friends also influence young drivers' risk behaviors. More concretely, friends' engagement in a road traffic risk behavior leads to corresponding descriptive and injunctive normative perceptions, which, in turn, lead to an adaptation of the behavior on the part of young drivers.

Normative Leaders

The present study was specifically interested in the question of whether there are normative leaders in friend networks: friends who have outsized norm-signaling relevance by shaping descriptive and injunctive normative perceptions to a specific extent. Inspired by the opinion leader concept, I examined whether friends who are recognized as advisors serve as normative leaders. The results for advisor friends' normative leadership were mixed. Regarding perceived descriptive norms, it did not make a difference whether normative signals come from the advisor or from nonadvisor friends: The impact on the ego's perceived prevalence of the behavior was the same. However, in the case of injunctive norms, the advisor friend significantly influenced stronger social approval perceptions than both other friends.

Thus, the results indicate that there are normative leaders, but that their scope of special influence has to be limited to perceptions about and influence processes through injunctive norms. In terms of the exemplar theory of category learning (Kahneman & Miller, 1986; Kashima et al., 2000), the results suggest that advisor friends' behaviors are viewed as particular representative exemplars of moral approval within the group and contribute to cognitive representations of the group's attitudes. This finding is also in line with the idea that influential individuals "share prevailing opinions and attitudes" (Katz & Lazarsfeld, 1955, p. 52) to a certain extent and can be seen as particularly representative of the group's values.

However, for texting and driving, the study did not reveal a distinct role of advisor friends in the formation of injunctive norms. Given the growing use of smartphones in various everyday situations (Vorderer, Krömer, & Schneider, 2016), texting and driving is more common among young people and possibly considered to be more in order. This might be why advisor friends who mainly seemed to serve as moral instances were not particularly considered in the formation of perceptions of texting- and drinking-related social approval.

In sum, the present study's results shed light on the formation of normative perceptions and its behavioral implications in friend networks. By providing normative signals through their behaviors, friends influence normative perceptions about the prevalence (i.e., descriptive norm) and the social approval (i.e., injunctive norm) of a behavior. Friends who are recognized as advisors play a particular role in this regard. They serve as normative leaders and distinctly influence normative perceptions about the behavior's social approval among their friends.

Implications for Research and Interventions

Implications for Social Norms Research

The study's results can be read as a further demonstration of the referent group's relevance for adolescents' health-related risk behaviors. Friends' normative characteristics and young drivers' normative perceptions accounted for approximately 40% to more than 50% of the variance of the drivers' road traffic risk behaviors. This result impressively demonstrates the need for considering referent groups and their (normative) characteristics to gain a comprehensive understanding of young drivers' road traffic risk behaviors. In this regard, the concept of "collective norms" (Lapinski & Rimal, 2005; Rimal & Lapinski, 2015) may be beneficial in future research. It refers to the reference group's actual behaviors and attitudes and, thus, allows further research to integrate the referent group's actual normative characteristics into a comprehensive approach to normative social influences (Geber, Baumann, Czerwinski & Klimmt, 2019).

More specifically, the present egocentric network approach was dedicated to the question of how normative perceptions are acquired, which has been largely neglected in social norms research thus far. Therefore, it took a differentiated look into the associations between reference group members' behaviors and an individual's perceived norms. This approach turned out to be beneficial in two ways. First, it corroborated the idea of "social exposure" (Mead et al., 2014) and showed that friends' behaviors provide normative signals based on which young people infer group norms. Further research might take up the idea of normative information sources and examine, for example, whether and how social media (where people are permanently exposed to friends' behaviors and attitudes; Johnson, 2014) may contribute to the formation of norms (Geber & Hefner, 2019). Second, the study demonstrated that social norms research benefits from considering different roles in people's social contexts. In addition to the state of social referent research (Paluck et al., 2016; Paluck & Shepherd, 2012), the present study showed that not only people who are highly connected and chronically salient in large school networks, but also friends who are recognized as advisors in small egocentric networks play a distinct role in the formation of norms. Future research might explore further important roles and examine how (i.e., through which means) this influence is exerted.

To conceptually link friends' behaviors with the ego's cognitive perceptions, the article refered to the idea of norm-signaling. However, the present study excluded the question of how normative signals are transmitted from friends to the ego. To learn more about these processes, future research might consider peer communication and peer observation as processes in the formation of normative perceptions (Chung & Rimal, 2016; Geber & Hefner, 2019; Mead et al., 2014; Real & Rimal, 2007). This may be particularly valuable regarding the integration of the leadership concept into social norms research, as it is through communication in particular that leaders exert influence (Hogg & Reid, 2006).

Implications for Opinion Leadership Research

The study results include implications for opinion leadership research by demonstrating that friends who are recognized as advisors by their friends take the role of normative leaders, particularly for moral perceptions. Compared with other friends, advisor friends play a distinct role in normative social influences by affecting normative perceptions about the social approval of a behavior to a particular extent. This result

supports the idea of opinion leaders as sources of normative influence (Katz & Fialkoff, 2017). In a recent article, Katz and Fialkoff (2017) nominated the concept of opinion leadership for "retirement." Given the present study's findings, future opinion leadership research should be dedicated to the normative meaning of opinion leaders and may be able to save the opinion leader concept from retirement in this way.

Implications for Norms-Based Intervention Strategies

By supporting the idea of normative social influences on risk behaviors, the study provides further evidence that interventions should address individual risk behaviors through a social norms approach (Berkowitz, 2004). More concretely, the study indicates that individual risk behaviors might be addressed through changing normative perceptions about a behavior's prevalence and approval. However, more important from a strategic point of view, the study shows that friends' behaviors are used as a normative information source by individuals to infer norms. Consequently, health communication strategies might consider whole groups of friends and their behaviors to effectively change individual risk behavior. In this regard, the results also indicate that the most effective way to change injunctive normative perceptions is to integrate advisor peers as ambassadors in health campaigns, as they are particularly influential regarding social approval perceptions.

Limitations

Four methodological aspects limit the study's contribution. First, and most important, causal mediational assumptions between friends' risk behaviors and individuals' perceived norms and risk behaviors were stated theoretically. However, empirically, the analyses were based on cross-sectional data, as all members were interviewed at the same time. Follow-up longitudinal research is needed to demonstrate advisor friends' norm-signaling relevance in terms of causality (Hayes, Preacher, & Myers, 2011).

Second, the analyses referred to single-item measures of norms and risk behaviors. The validity of single items has been questioned, because items might go along with measurement errors (Nunnally & Bernstein, 1994) and may be unable to fully represent a complex theoretical concept (McIver & Carmines, 1981). However, asking respondents for the perceived prevalence of behavior among their peers and their peers' approval is the most adequate measurement for descriptive and injunctive norms (see also Real & Rimal, 2007; Rimal & Real, 2005). In addition, the replication of the results on normative social influences across three different risk behaviors increased the results' validity.

Third, behaviors were measured with self-reports. Especially for risk behaviors, the use of self-assessments might be biased because of social desirability concerns (Brener, Billy, & Grady, 2003). Future research addressing the relationship between norms and (risk) behaviors should combine observational data on behaviors and survey data on normative perceptions (Baumeister, Vohs, & Funder, 2007).

Fourth, endogeneity was possible between the self-reported behaviors and the self-reported normative perceptions. Although normative perceptions were not assessed directly after or before the ego's own behavior in the present survey, anchor and adjusting effects cannot be excluded completely (Gehlbach & Barge, 2012). Future research might combat this bias by counterbalancing the order in which questions about norms and behaviors are asked.

Conclusion

The present study sheds light on the formation of normative perceptions and its behavioral implications in egocentric friend networks. The study shows the norm-signaling relevance of friends' behaviors, that is, friends' influence on young drivers' perceived descriptive (i.e., perceived prevalence) and injunctive (i.e., perceived social approval) norms and the impact of these normative perceptions on the drivers' road traffic risk behaviors. In addition, and inspired by the concept of opinion leadership, the results indicate that there are normative leaders in small egocentric networks: friends who are recognized as advisors have distinct norm-signaling relevance, by shaping injunctive normative perceptions to a particular extent compared with nonadvisor friends. These findings contribute to social norms research by providing answers to the question of where normative perceptions come from and to opinion leadership research by showing that it might be beneficial to pursue the normative meaning of opinion leaders. From a practical perspective, the study indicates that norms-based intervention strategies can be particularly effective by identifying and integrating normative leaders in their communication strategies.

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